CLAIMS:

1. An integrated tuner circuit, comprising:

a tuned LC band-pass filter (10) having a variable capacitance ($C_t$) and fixed inductance (L);

an external load capacitor having a variable capacitance ($C_t$); and

a fixed-frequency control loop (30) for producing a voltage ($V_{TUN}$) for adjusting the variable capacitances of the band-pass filter and external load capacitor to achieve tracking of the band-pass filter with an arbitrary oscillator frequency $\omega_{LO}$.

2. The integrated tuner circuit according to claim 2, wherein the fixed-frequency control loop (30) further comprises a fixed-frequency oscillator (32) and a circuit (34) for receiving a programmable value N for setting the value of $\omega_{LO}$, wherein the fixed-frequency control loop adjusts the variable capacitances $C_t$ such that $C_t$ :: $(\omega_{LO} \pm \omega_{IF})^{-2}$ :: $N^{-2}$, wherein $\omega_{IF}$ is an intermediate frequency.

3. The integrated tuner circuit according to claim 2, wherein the band-pass filter (10) is tuned to each of a plurality of different IF distances from $\omega_{LO}$ by adjusting the programmable value N.

4. The integrated tuner circuit according to claim 2, wherein the fixed-frequency oscillator (32) outputs a signal having a frequency $\omega_{xtal}$, and wherein the tuned LC band-pass filter (10) is tuned to a virtual oscillator frequency $\omega_{LO}$ given by $N\omega_{xtal}$.

5. The integrated tuner circuit according to claim 1, wherein the fixed-frequency control loop (30) provides compensation for parasitic capacitance ($C_p$).

6. The integrated tuner circuit according to claim 5, further comprising a capacitor corresponding to the parasitic capacitance $C_p$ in parallel with the external load capacitor.

7. The integrated tuner circuit according to claim 1, wherein the fixed-frequency control loop (30) operates to produce a signal:

$$1 - (\alpha\omega_{xtal}^2 R^2 C) N^2 C_t \rightarrow 0$$

where $\alpha$ is a variable gain, $\omega_{xtal}$ is a frequency of a fixed-frequency oscillator, R is a resistance, C is a capacitance, and N is a programmable value for setting the value of $\omega_{LO}$.

8. The integrated tuner circuit according to claim 7, wherein N and $C_t$ are the only oscillator frequency dependent variables.

9. A method for tracking a LC tuned band-pass filter (10) with an arbitrary oscillator $\omega_{LO}$, wherein the band-pass filter includes a variable capacitance $C_t$ and a fixed inductance (L), comprising:

providing a fixed-frequency control loop (30) for producing a voltage ($V_{TUN}$) for adjusting the variable capacitance $C_t$ of the tuned band-pass filter (10) and for adjusting a variable capacitance $C_t$ of a load capacitor; and

inputting a programmable value N into the fixed-frequency control loop (30) for setting the value of $\omega_{LO}$, wherein the fixed-frequency control loop adjusts the variable capacitances $C_t$ such that $C_t :: (\omega_{LO} \pm \omega_{IF})^{-2} :: N^{-2}$, wherein $\omega_{IF}$ is an intermediate frequency.

10. The method according to claim 9, further comprising:

tuning the band-pass filter (10) to each of a plurality of different IF distances from $\omega_{LO}$ by adjusting the programmable value N.

11. The method according to claim 9, wherein the fixed-frequency control loop (30) includes a fixed-frequency oscillator (32) that outputs a signal having a frequency $\omega_{xtal}$, further comprising:

tuning the band-pass filter (10) to a virtual oscillator frequency $\omega_{LO}$ given by $N\omega_{xtal}$.

12. The method according to claim 9, wherein the fixed-frequency control loop (30) provides compensation for parasitic capacitance ($C_p$).

13. The method according to claim 12, further comprising:

providing a capacitor corresponding to the parasitic capacitance $C_p$ in parallel with the load capacitor.

14. The method according to claim 9, wherein the fixed-frequency control loop (30) operates to produce a signal:

$$1 - (\alpha\omega_{xtal}{}^2R^2C)N^2C_t \rightarrow 0$$

where $\alpha$ is a variable gain, $\omega_{xtal}$ is a frequency of a fixed-frequency oscillator, R is a resistance, and C is a capacitance.

15. The method according to claim 14, wherein N and $C_t$ are the only oscillator frequency dependent variables.